NanoParticle Systems for BWA Detection

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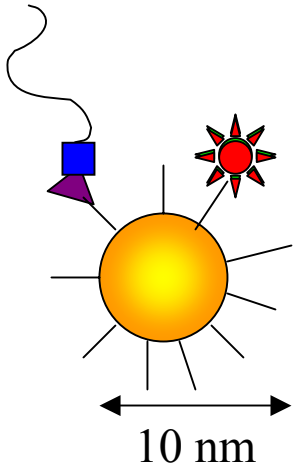
Modular Nanoprobes – Multiple Reporting Mechanisms

Universal NanoParticles

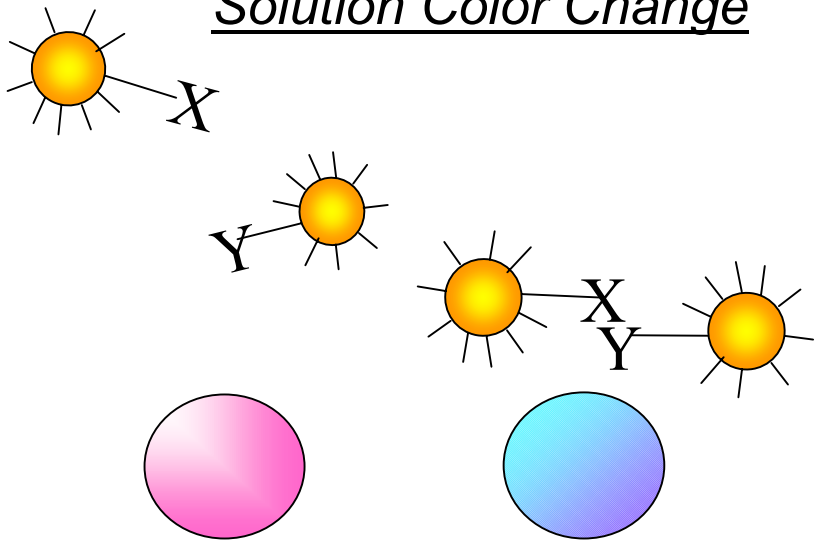
Low Interference

Stay in Suspension

Novel Surface Chemistry Yields Universal Reagents

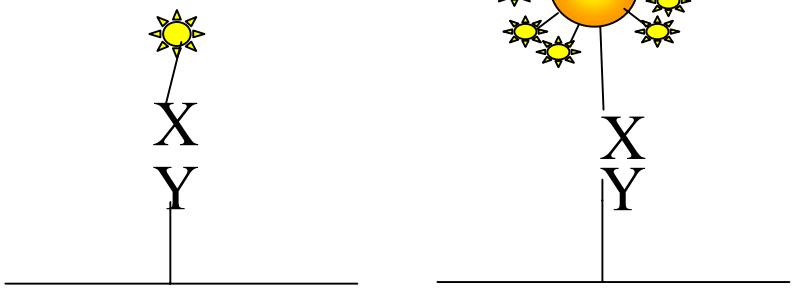


Solution Color Change



Enhanced Sensitivity

1 Interaction = Many Signals

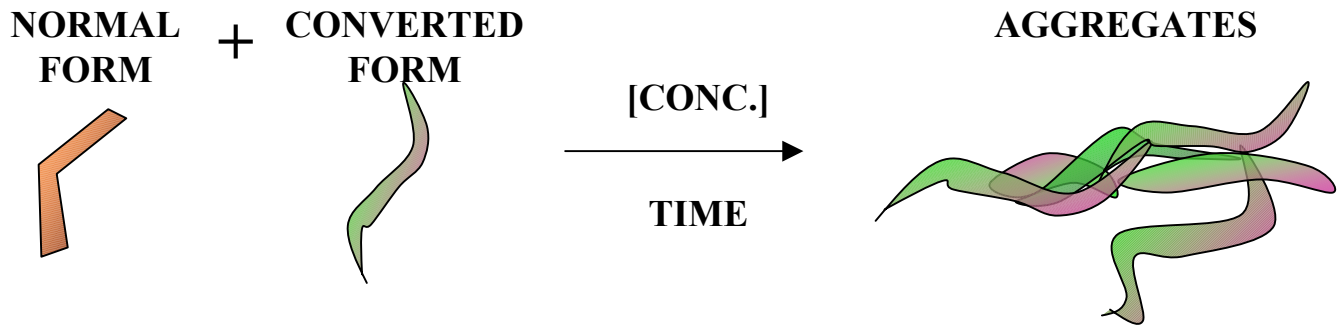


BioSensors
Dedicated vs. Universal

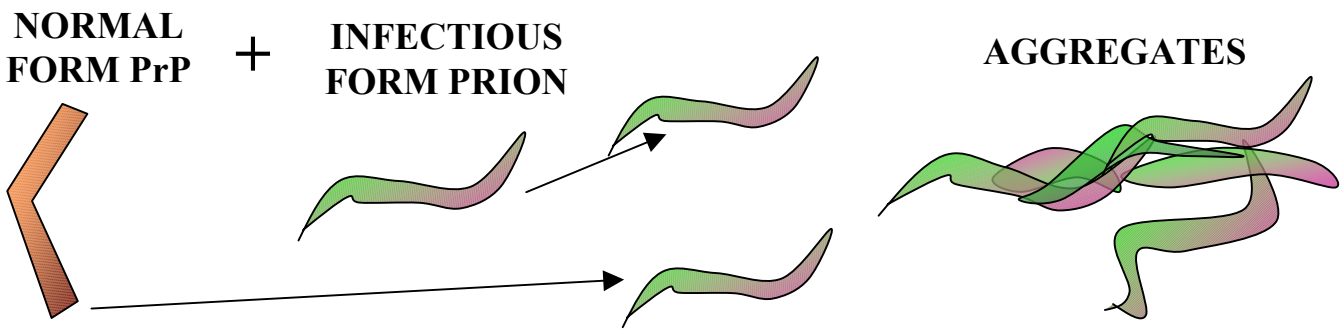
- A prion detector
- Detects the hallmark of prion diseases – abnormal protein self-aggregation
- Prion amplification
- Rapid and accurate thru specialized technology

- **A multiplexed detector**
- **Capable of simultaneously assaying for the presence of more than 250 factors**
- **Rapid and accurate thru redundancy: cognate antibodies, toxic factors, DNA signatures**

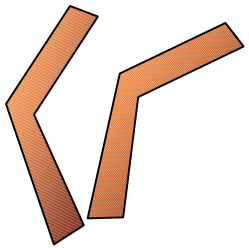
Neurodegenerative Diseases Are Characterized by Formation of Aggregates



ALZHEIMER'S:	BETA-AMYLOID
PARKINSON'S:	ALPHA-SYNUCLEIN
HUNTINGTON'S:	HUNTINGTIN
BSE (PRION):	**PrP**



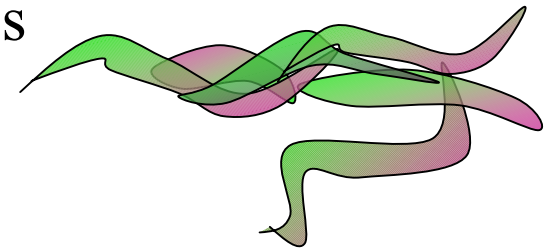
Existing methods are variations of standard sandwich assays



PRP^{sen}

Brain Homogenates

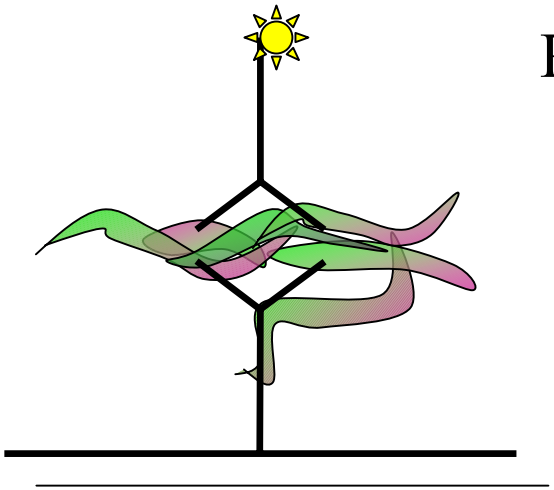
Digest with Proteinase K to separate monomers from aggregates

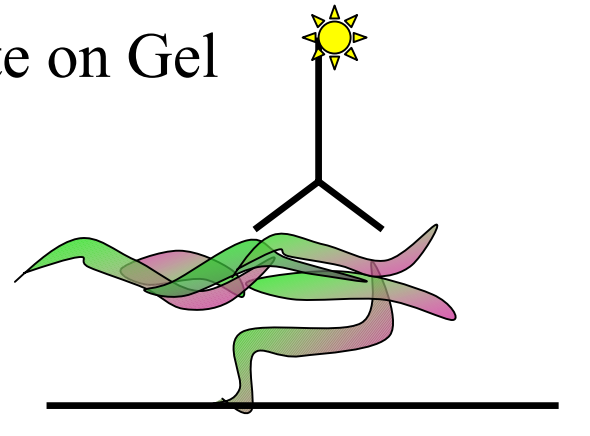


PRP^{res}

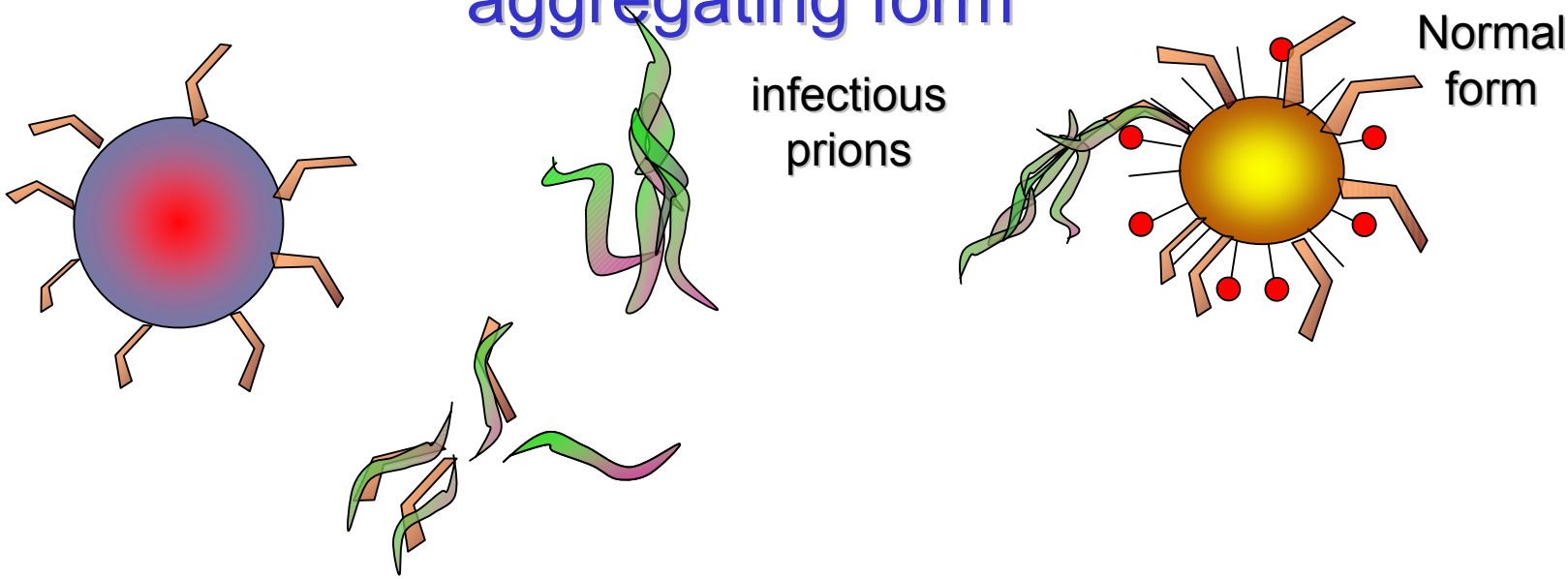
Pellet → Separate on Gel

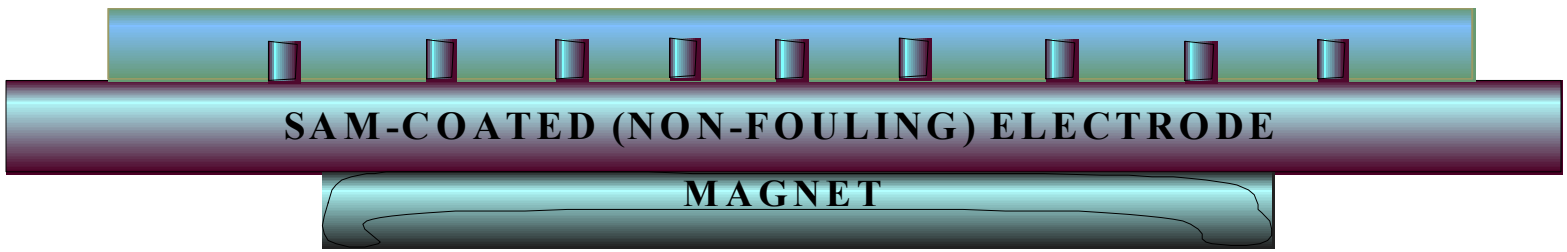
Probe with anti-PRP





Minerva technology detects hallmark of prion diseases – conversion of normal form to self-aggregating form





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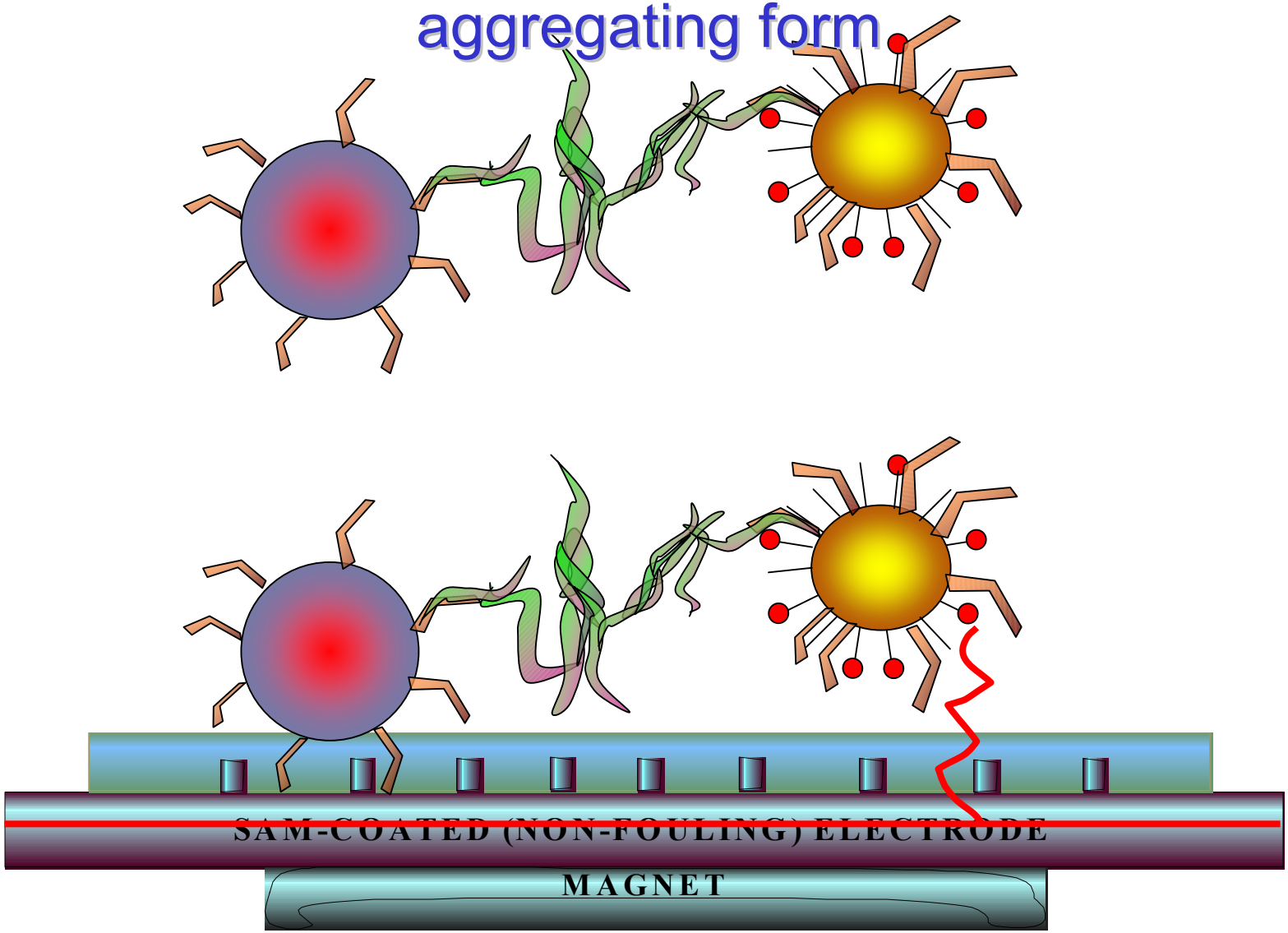
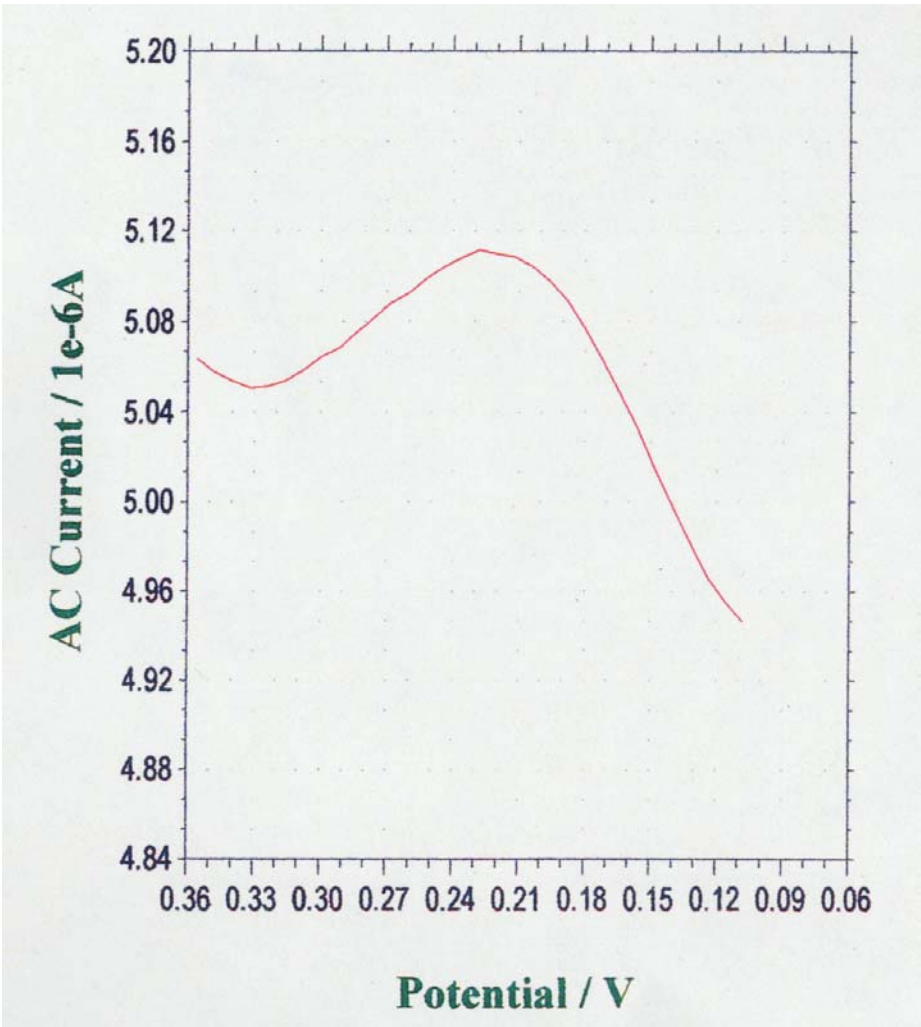
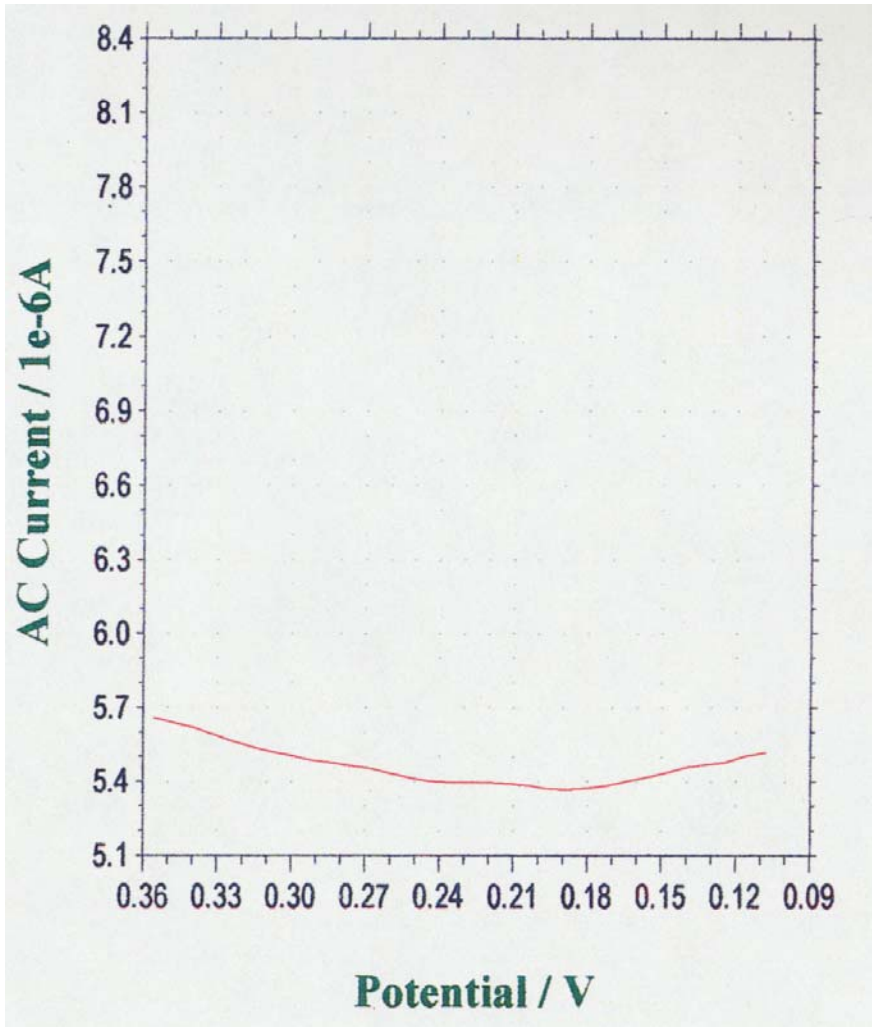


Electronic Detection with Model System – Alzheimer's

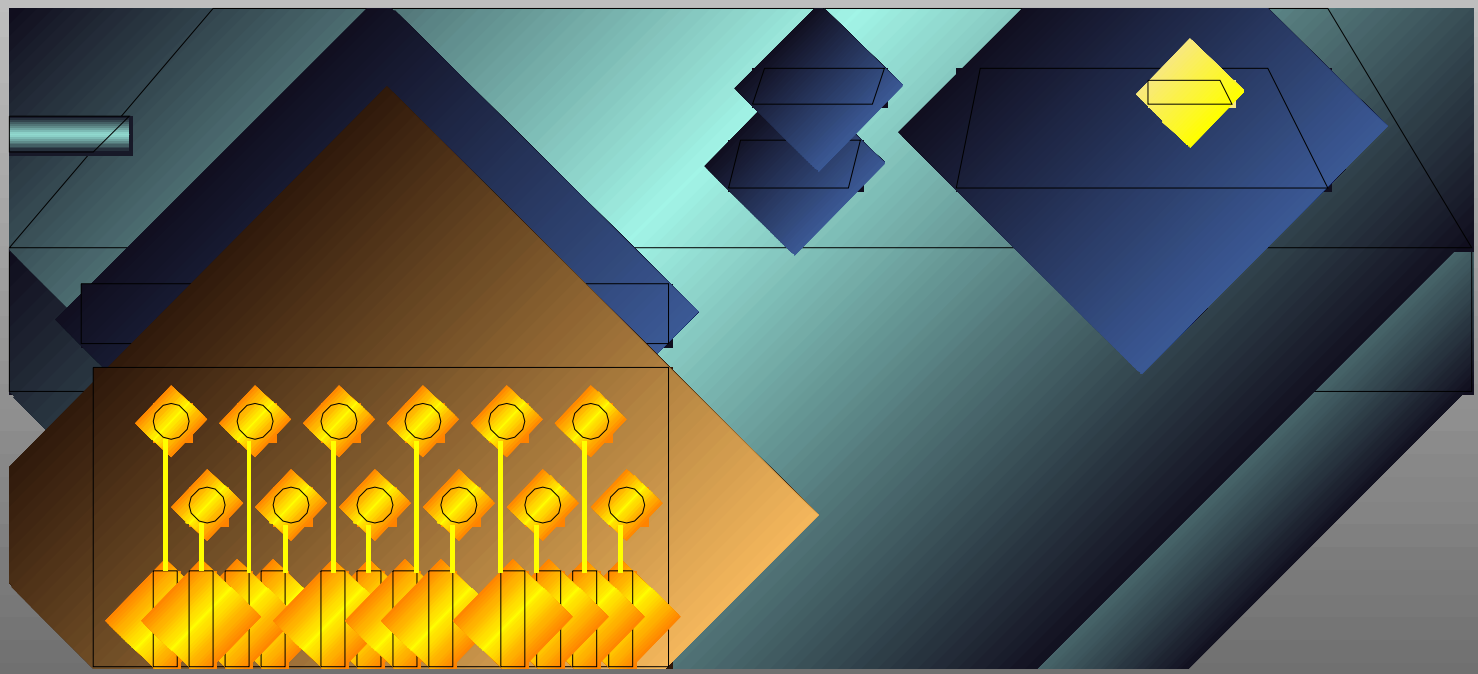
Sample has pre-formed aggregates & non-aggregated proteins. Specific antibody is immobilized on nanoparticles then electronically detected



Sample does not have pre-formed aggregates, but has non-aggregated proteins. Specific antibody is immobilized on nanoparticles then electronically detected



Electronic Detection is Compatible with Cost-Effective Point of Care Microsensors



KEY CHARACTERISTICS: A COMPARISON

CURRENT ASSAYS

- Complex sample prep steps
- Slow, sequential, labor-intensive
- Insensitive – cannot yet detect in animal less than 24 months or live animal
- Requires skilled personnel

MINERVA's TECHNOLOGY

- Detects abnormal protein aggregation which is the hallmark of prion disease
- Normal form proteins can be added free in solution to "amplify" signal
- Sensitive – capable of detecting disease in live animal
- Automated read-out: no need for skilled personnel